

SWIM Connect 2015

Information Exchange in the Air: Utilizing IP Data Links

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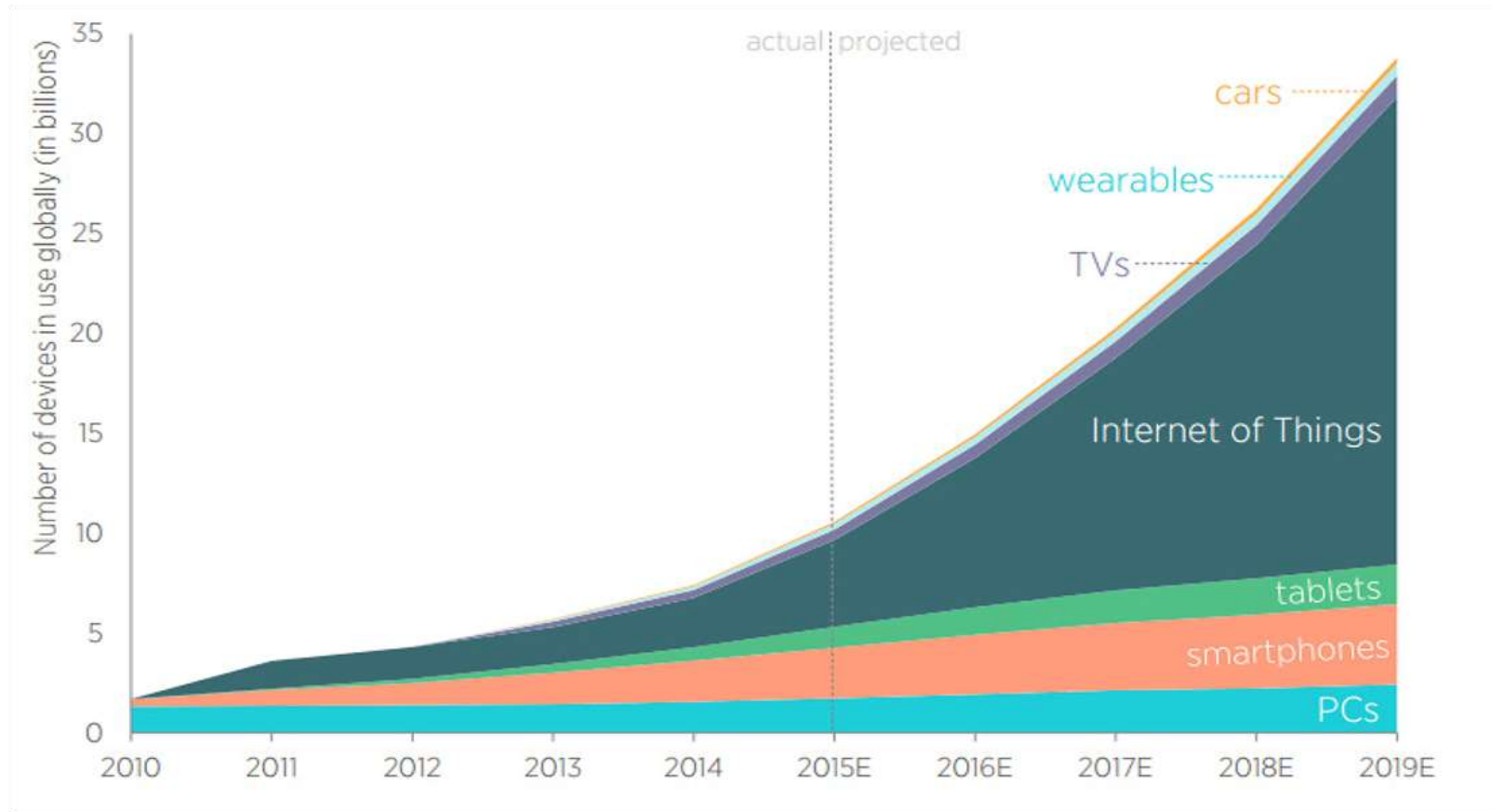


Federal Aviation
Administration

The SWIM connect 2015 logo is centered within a large white circle on a blue background. The word "SWIM" is in a large, bold, black sans-serif font. To its right are three blue circles of varying sizes. Below "SWIM", the words "connect 2015" are written in a smaller, black, lowercase sans-serif font.

SWIM
connect 2015

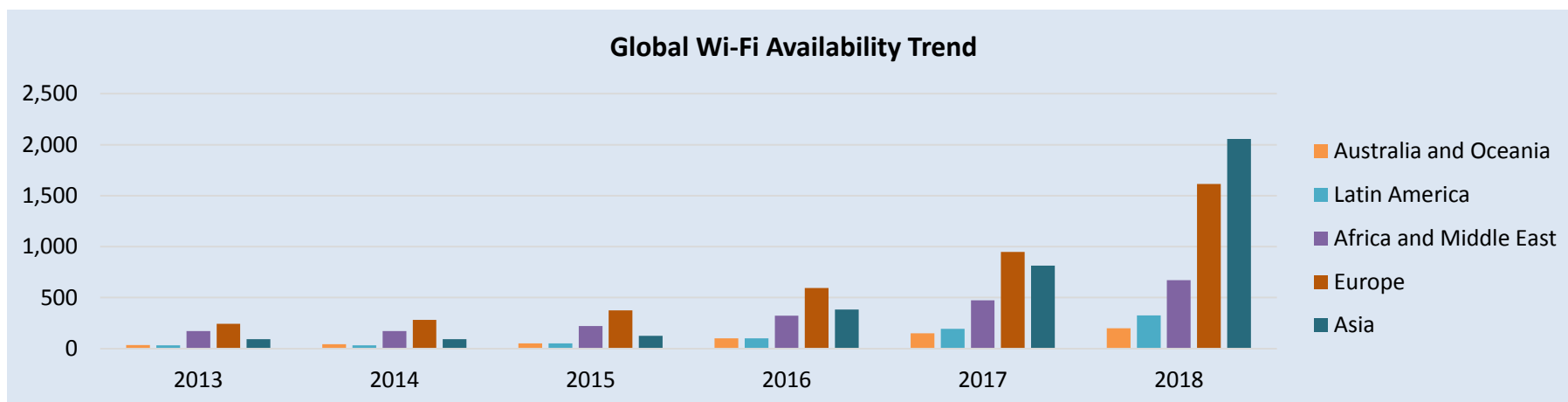
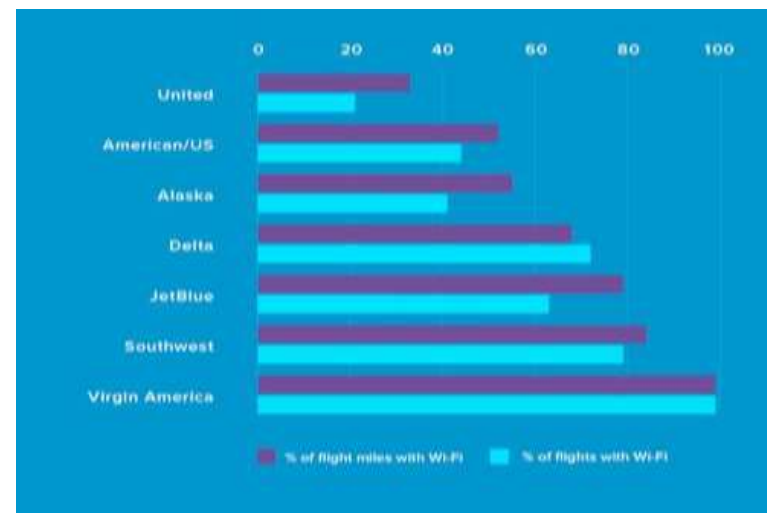
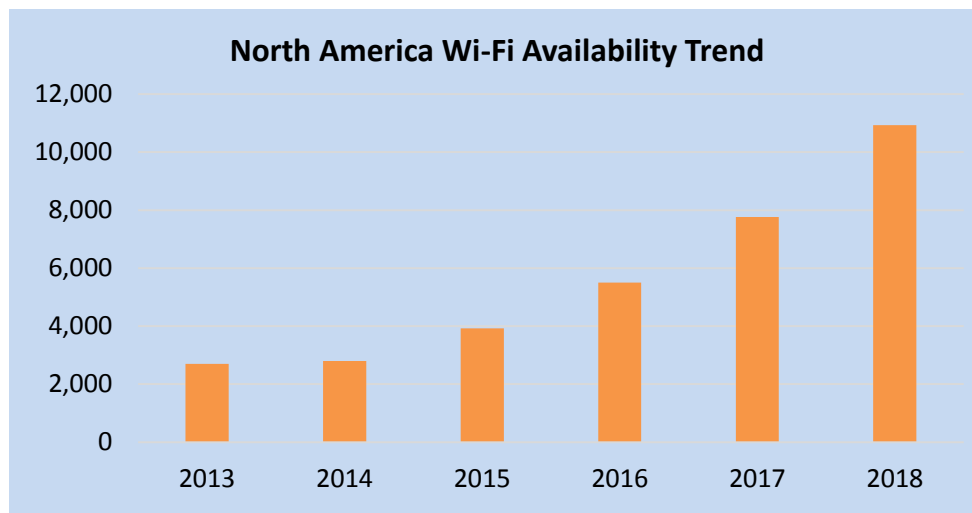
Information Sharing



Source: John Greenough, "The Internet of Everything 2015," *Business Insider Intelligence*. Produced by Adam Thierer and Andrea Castillo, Mercatus Center at George Mason University, 2015.

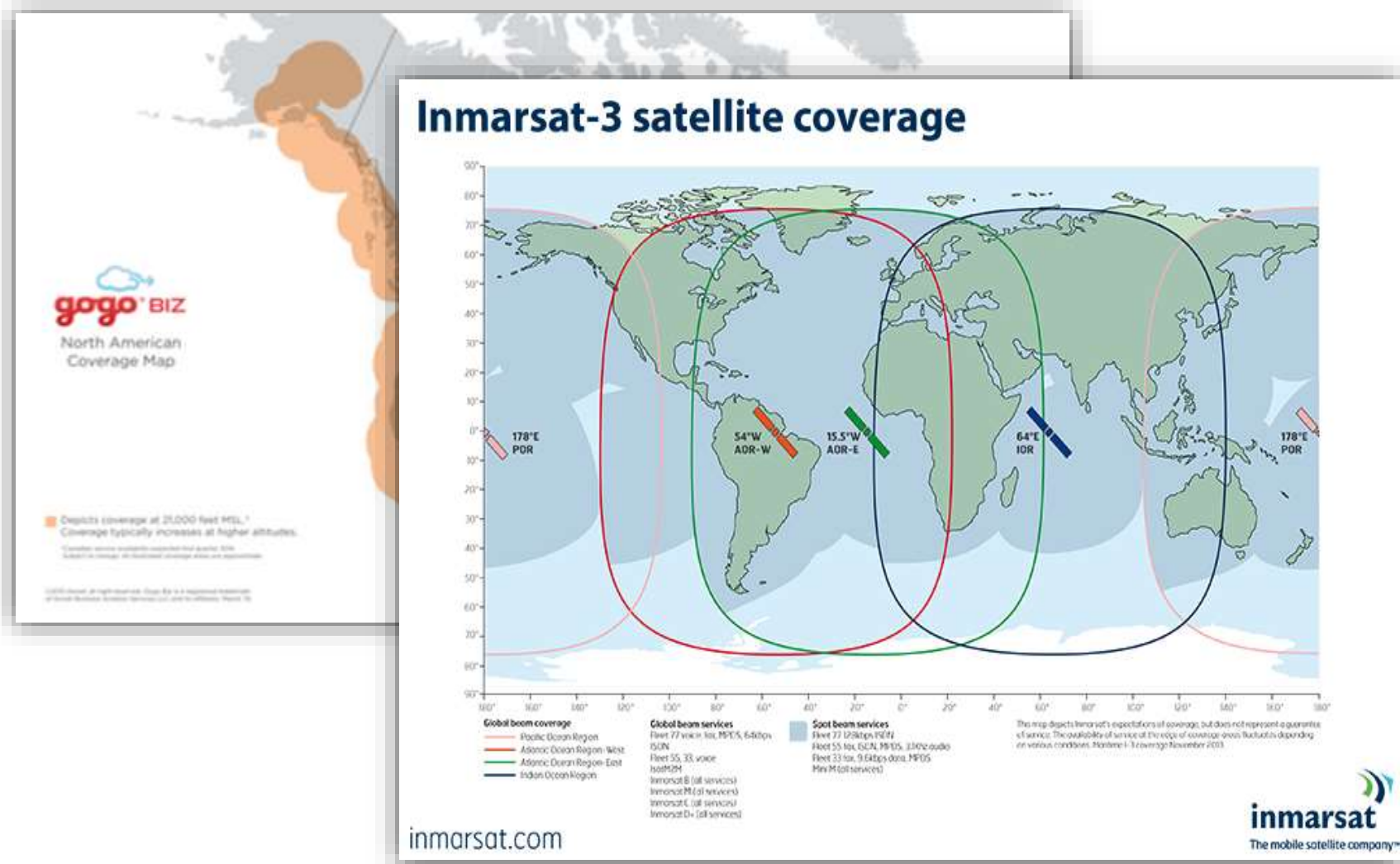
Source: <http://mercatus.org/publication/projecting-growth-and-economic-impact-internet-things>

Inflight Wi-Fi Growth



Source: <http://www.ipass.com/wifi-growth-map/>
<http://mashable.com/2015/01/26/inflight-wifi-2015/#NsRzaMJmmaqB>

IP Data Link Coverage



Electronic Flight Bags (EFB)

Commercial Electronic Flight Bag Market Worth \$4.27 Billion by 2020

Surface Pro 3 Moving Into Mostly Commercial Cockpits

Thales Launches New Generation Electronic Flight Bag Application Suite with First Customer Air

United Airlines Deploying 11,000 iPads to Pilots as Electronic Flight Bags

Jeppesen Provides Digital Solutions To Help JetBlue Achieve Paperless Operations

American Airlines Pilots Lose 40% With Apple iPad Electronic Flight Bag

Ryanair to issue 3,500 Apple iPad electronic flight bags to pilots

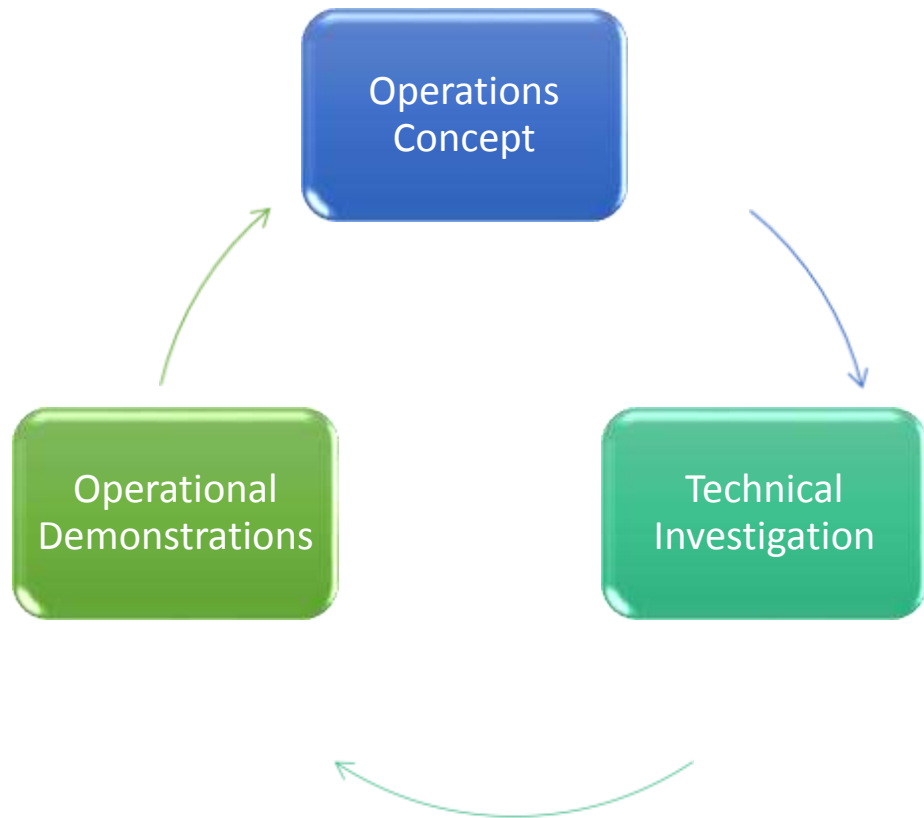
Delta to equip 11,000 pilots with Microsoft Surface 2 devices for their electronic flight bags

Surface Pro 3 on plane: Microsoft gains FAA 'flight bag' clearance

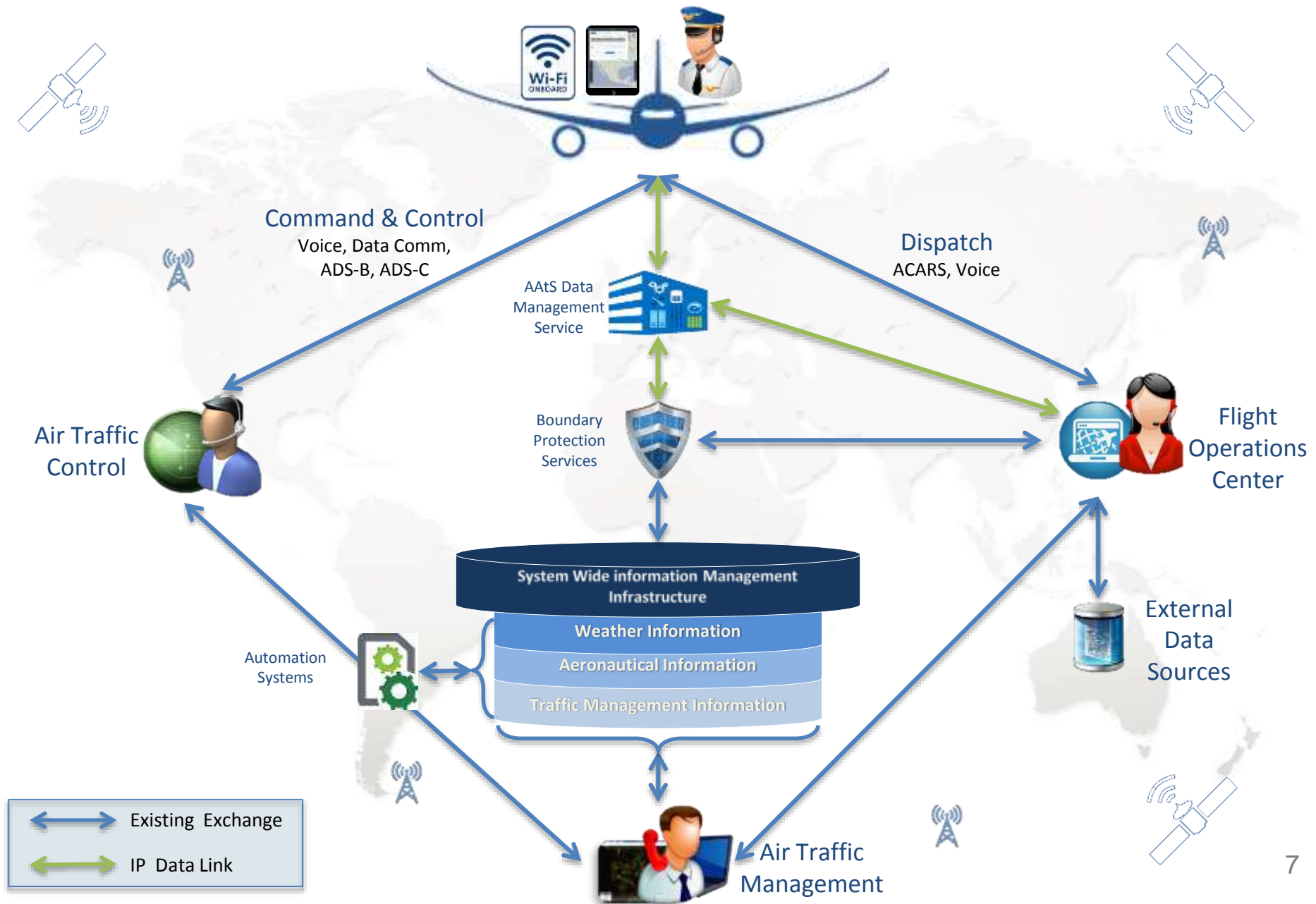
Surface 3 to be used by 7,500 ExpressJet and SkyWest Airlines pilots

Aircraft Access to SWIM (AAtS) Activities

- Operations Concept
 - AAtS Operational Concept Document
 - AAtS Benefits Analysis
- Technical Investigation
 - System Architecture
 - Implementation Guidance Document
- Operational Demonstrations
 - Live Proof of Concept Demonstration Flights



Operational Overview



Operational Demonstrations



- Weather
- NOTAMs
- Flight Information Update
- Electronic PIREP Submission
- Aircraft Preference Publication
- 4DT Preference Exchange
- Security



Current SWIM Product Portfolio (1 of 2)

Flight and Flow Data

Traffic Flow Management System (TFMS): Provides flight data and flow information

- ✓ Flow Constrained Area (FCA) / Flow Evaluation Area (FEA)
- ✓ Airspace Flow Program (AFP)
- ✓ Aircraft Situation Display to Industry (ASDI)
- ✓ Ground Delay Program (GDP) / Unified Delay Program (UDP)
- ✓ Ground Stops (GS)
- ✓ Reroutes
- ✓ Advisories
- ✓ Collaborative Trajectory Options Program (CTOP)

SWIM Terminal Data Distribution Systems (STDDS): Collects and publishes data from 150+ airports

Surface Movement Event Service

- ✓ Spot-In / Spot-Out Times
- ✓ Wheels-Up / Wheels-Down Times
- ✓ Aircraft ID / Type / Wake Class
- ✓ Position / Heading / Speed / Altitude
- ✓ Mode S / Mode 3A
- ✓ Departure or Arrival Runway
- ✓ Departure Fix for Departures
- ✓ Departure Airport for Arrivals
- ✓ Coasted / Suspended Track No.
- ✓ Fused Track Acceleration
- ✓ ADS-B Information
- ✓ Source Information

Airport Data Service

- ✓ Runway Visual Range (100s of feet)
- ✓ Visibility Trend (steady / incr. / decr.)
- ✓ Runway Edge / Center Lighting

Terminal Automation Info. Service

Flight Plan (FP)

- ✓ Aircraft ID / Type
- ✓ Flight Rules in FP Record
- ✓ FP Status (pending, active, etc.)
- ✓ Flight Type (arr. / dep. / enroute)
- ✓ RNAV Indicator
- ✓ Assigned Runway
- ✓ Entry / Exit Fix

Track

- ✓ Track Status (active / coast / drop)
- ✓ Position / Velocity
- ✓ Beacon Code / Mode C

Tower Departure Event Service

- ✓ Aircraft Parking Gate
- ✓ Pre-Departure Clearance Time
- ✓ Taxi-Start / Takeoff Times

Time Based Flow Management (TBFM): Provides metering information

- ✓ Scheduled Time of Arrival (STAs)
- ✓ Estimated Time of Arrival (ETAs)
- ✓ Meter Reference Elements (MREs) Assignments
- ✓ Airport Configuration Information
- ✓ Satellite Airport Configurations

SWIM Flight Data Publication Service (SFDPS): Provides flight data and updates to clients for filed and active flight plans

- ✓ Flight Plan & Update Information
- ✓ Flight Amendment Information
- ✓ Converted Route Information
- ✓ Cancellation Information
- ✓ Departure Information
- ✓ Aircraft ID Amendment
- ✓ Hold Information
- ✓ Progress Report Information
- ✓ Expected Departure Time Information
- ✓ Position Update Information
- ✓ Tentative Flight Plan Information
- ✓ Tentative Aircraft Identification Amendment Information
- ✓ Tentative Flight Plan Removal
- ✓ Tentative Flight Plan Amendment Information
- ✓ Track / Drop Track Information
- ✓ Interim Altitude Information
- ✓ ARTS Flow Control Track/Full Data Block Information
- ✓ Beacon Code Reassignment
- ✓ Beacon Code Restricted
- ✓ Flight Plan Data Bank (FDB) Fourth Line Information
- ✓ Point Out / Inbound Point Out Info
- ✓ Handoff Status

Airspace Data Publication Service: Published by SFDPS

- ✓ Sector Assignment Status
- ✓ Route Status
- ✓ Special Activities Airspace (SAA)
- ✓ Altimeter Setting

Operational Data Publication Service: Published by SFDPS

- ✓ Instrument Approach / Traffic Count Adjustment
- ✓ Sign In Sign Out
- ✓ Beacon Code Utilization
- ✓ Geographic Beacon Code Utilization

General Information Message Publication Service: Published by SFDPS

- ✓ General Information

Current SWIM Product Portfolio (2 of 2)

Weather Data

Integrated Terminal Weather System (ITWS) Data Publication:

Provides specialized weather products in the terminal area

- ✓ Configured Alerts
- ✓ Forecast Accuracy / Contour / Image
- ✓ ITWS Status Information
- ✓ Gust Front TRACON Map
- ✓ Microburst TRACON Map
- ✓ Tornado Alert
- ✓ Precipitation: 5nm, Long Range, TRACON
- ✓ Wind Shear ATIS
- ✓ Storm Motion: 5NM, TRACON
- ✓ Storm Motion - Storm Extrapolated Positions: 5nm, Long Range, TRACON
- ✓ Tornado Detections Wind Profile
- ✓ Anomalous Propagation (AP) Indicated Precipitation
- ✓ AP Status
- ✓ Gust Front Estimated Time to Impact
- ✓ Hazard Text: 5nm, Long Range, TRACON
- ✓ Runway Configuration
- ✓ Microburst Automatic Terminal Information Service (ATIS)
- ✓ Terminal Weather Text Normal
- ✓ Terminal Weather Text Special

Corridor Integrated Weather System (CIWS) Data Publication*:

Provides specialized 3D storm related weather information in the En Route area

- ✓ Vertically Integrated Liquid (VIL) Mosaic (1km resolution)
- ✓ VIL 2-hr. Forecast
- ✓ Echo Tops Mosaic (1 km resolution)
- ✓ Echo Tops 2-hr. Forecast
- ✓ Satellite Mosaic
- ✓ Storm Info: Echo Top Tags, Leading Edges, Motion Vectors
- ✓ VIL Forecast Contours (Std. Mode)
- ✓ VIL Forecast Contours (Winter Mode)
- ✓ Echo Tops Forecast Contours
- ✓ Growth & Decay Contours
- ✓ Forecast Accuracy: Echo Tops, Std. Precipitation, Winter Precipitation

Weather Message Switching Center Replacement (WMSCR)

Publications: Provides NWS textual aviation weather products

- ✓ Transmission of Voice Pilot Reports (PIREPs) to WMSCR
- ✓ Altimeter Settings
- ✓ Stored PIREPs

Enhanced Weather Information Network System

- ✓ Current Icing Product (CIP)
- ✓ Weather Research and Forecasting-Rapid Refresh (WRF-RR) Model Data
- ✓ North American Mesoscale (NAM) Model Data
- ✓ Global Forecast System (GFS) Model Data
- ✓ Airmen's Meteorological Information (AIRMET)
- ✓ National Convective Weather Forecast (NCWF)
- ✓ National Convective Weather Diagnostic (NCWD)
- ✓ Aviation Routine Weather Report (METAR)
- ✓ Significant Meteorological Information (SIGMET)
- ✓ Collaborative Convective Forecast Product (CCFP)

Weather and Radar Processor (WARP) Publications

- ✓ Next Generation Weather Radar (NEXRAD)

Aeronautical Data

Aeronautical Information Management (AIM) Special Use Airspace (SUA) Data Exchange: Provides notification and status regarding airspace

- ✓ SUA Data, dynamically provided in the Aeronautical Information Exchange Model (AIXM) standard
- ✓ AIXM SUA Definitions

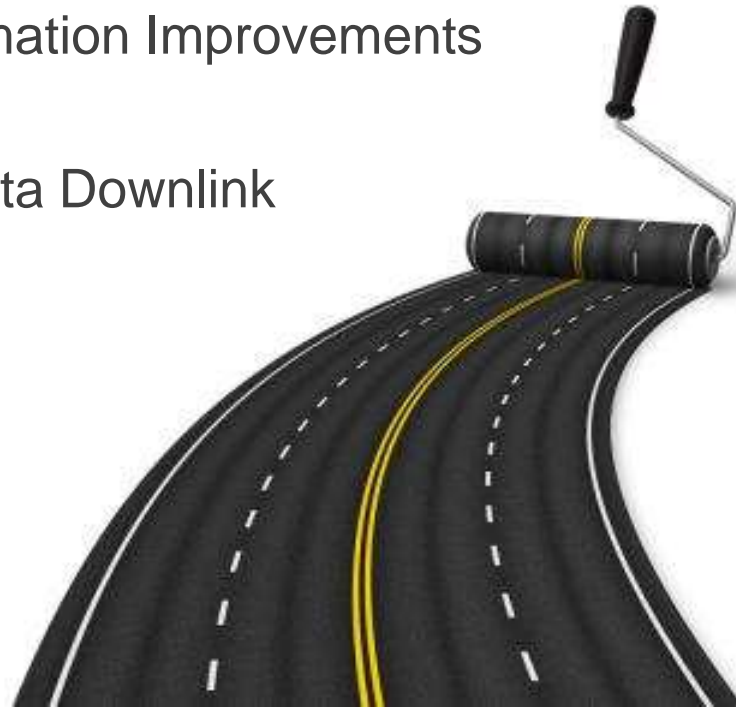
Notices to Airmen (NOTAM) Distribution Service

- ✓ Digital NOTAMs AIXM 5.1

*Service in development or on-ramping process

Looking Ahead

- SWIM Data Maturity
- IP Data Link Advancements
- Increased EFB and Avionics Integration
- Air Traffic Management Automation Improvements
- Automated Position Reporting
- Automated Aircraft Sensor Data Downlink
- Much More...



Questions/Contacts

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